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I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PR 9949 for a patent by TROY CLUTTON as filed on 14 January 2002.

WITNESS my hand this
Third day of February 2003

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SUPPORT AND SALES

AUSTRALIA

PATENTS ACT 1990

PROVISIONAL SPECIFICATION

FOR THE INVENTION ENTITLED:-

"A FIN ASSEMBLY"

The invention is described in the following statement:-

The present invention relates to a fin and in particular to a fin assembly.

The invention has been developed primarily for use with surf craft such as surfboards and will be described hereinafter with reference to that application. However, the invention is not limited to that particular field of use and is also applicable to other surf craft including surf skis and bogie boards and to water craft including kayaks, canoes, boats, sailboards and the like.

Known fins for surfboards have only incrementally advanced in the last forty years notwithstanding the reduction in size of boards and the use of modern manufacturing materials and techniques. An early style fin was used with the Malabo board, while more recent boards typically make use of a fin known as the Simon Andersen fin. The latter was introduced in the 1980's and was developed into a triple fin arrangement that was disposed at the rear of the board. The centre one of the three fins included symmetric faces and was mounted along the centre line of the board. The other two fins included asymmetric faces and were mounted at an acute angle to the centre line adjacent to but forward of the centre fin. This arrangement was reputed to provide the "Three Fin Thrust".

While the triple fin arrangement has significant advantages over the Malabo fin, it also has substantial limitations, such as increased drag and reduced manoeuvrability.

Another innovation was the Ben Lexcen fin as designed for surf craft after its success with yachts and the Australian victory in the America's Cup of 1980. This fin design was the most radical deviation from the standard fin design known to date. However, as presently understood, it has enjoyed neither significant commercial success nor acceptance within the surfing community.

Fins are now modular and generally bought separately to a board. While this allows for fin design to occur separately from that of the board, there is scant evidence that this is the case.

It is an object of the present invention to ameliorate at least some of the deficiencies of the prior art or to provide a useful alternative.

According to a first aspect of the invention there is provided a fin assembly for a surf craft, the assembly including:

a base for mounting the assembly to the surf craft;

a primary fin extending from the base and having a leading primary edge and a trailing primary edge; and

a secondary fin extending from the base and having a leading secondary edge and a trailing secondary edge.

Preferably, the base and the fins are integrally formed.

Preferably also, the leading edges of the fins are aligned. More preferably, the leading and the trailing edges are aligned. Even more preferably, the base extends longitudinally between the leading primary edge and the trailing secondary edge.

In a preferred form, the trailing primary edge and the leading secondary edge are joined by an intermediate arcuate edge defined by the base. More preferably, the arcuate edge is of varying radius.

Preferably, the leading fin extends along a first plane that is normal to the base. More preferably, both the leading and trailing fins extend along the first plane.

Preferably also, the fins include respective pairs of opposite faces that extend between the leading and trailing edges. More preferably, one or more of the faces are substantially planar. In other embodiments, however, one or more of the faces are substantially arcuate.

In a preferred form, fins are longitudinally spaced apart. In some embodiments, the fins are transversely spaced apart.

According to a second aspect of the invention there is provided a fin assembly including:

a base for mounting the assembly to an object;

a primary fin extending from the base and having a leading primary edge and a trailing primary edge;

a secondary fin extending rearwardly from the base and having a leading secondary edge and a trailing secondary edge.

Preferably the leading primary edge is curved substantially complementarily to the leading secondary edge.

According to a third aspect of the invention there is provided a fin assembly including:

a base for mounting the assembly to an object;

a larger fin extending from the base and having a leading primary edge and a trailing primary edge and a high rake;

a smaller fin extending rearwardly from the base and having a leading secondary edge and a trailing secondary edge.

Preferably, the edges extend along a single plane. More preferably, smaller fin is, in use, deformable in a direction normal to the plane.

Preferred embodiments of the present invention will now be described, by way of examples only, with reference to the accompanying drawings in which:

Figure 1 shows a side view of a fin assembly according to a first embodiment of the present invention;

Figure 2 shows a side view of a fin assembly according to a second embodiment;

Figure 3 shows a side view of a fin assembly according to a third embodiment;

Figure 4 shows a rear view (elevation) of a fin assembly according to a first embodiment; and

Figure 5 shows an inverted plan view (underside) of a fin assembly according to a forth embodiment.

Referring to Figure 1, there is illustrated an integrally formed fibreglass fin assembly 1 including a base 2 for mounting the assembly to an object in the form of a surfboard 3. A primary fin 4 extends from base 2 and has a compound arcuate leading primary edge 5 and a compound arcuate trailing primary edge 6. A secondary fin 7 extends rearwardly from base 2 and has a compound arcuate leading secondary edge 8 and a compound arcuate trailing secondary edge 9. The arcuate form of the leading primary edge 5 and leading secondary edge 8 are substantially complementary.

Base 2 and fins 4 and 7 are integrally formed and the leading edges of the fins are aligned. Moreover, the base extends longitudinally between edges 4 and 7.

Edges 5 and 6 intersect to define a primary fin tip 10, while edges 8 and 9 intersect to define a secondary fin tip 11. Tip 10 is an inflection point of edges 5 and 6, while tip 11 is an inflection point of edges 8 and 9.

Tip 10 is more proximal to base 2 than the portion of edge 5 that is immediately adjacent to tip 10. That is, edge 5 over wraps the adjacent portion of edge 6.

Edge 6 and edge 8 are joined by an intermediate arcuate edge 13 that is defined by base 2. Edge 13 is of varying radius.

In this embodiment, the fins are longitudinally spaced apart. However, in other embodiments, the fins are transversely spaced apart.

Each fin 4 and 7 includes respective pairs of opposite faces 15 and 16 that extend between the respective leading and trailing edges. In this embodiment, all of faces 15 and 16 are non-planar. However, in other embodiments, one of each face 15 and 16 is

substantially planar. More preferably, the planar faces are on corresponding sides of the respective fins. In still further embodiments, all faces 15 and 16 are substantially planar. It will be appreciated from the teaching herein that other combinations are available.

Preferably, any non-planar faces are substantially arcuate.

As best shown in Figure 4, fin 4 extends along a plane 20 that is normal to base 3. Accordingly, when the base is attached to the underside of a surf craft, fin 4 is also normal to and extends away from that underside. Fin 7 also extends along plane 20 and parallel to fin 4. However, in other embodiments, fin 7 extends other than along plane 20. For example, reference is now made to Figure 5 that illustrates a fin 21 according to another preferred embodiment of the invention, where corresponding reference numerals denotes corresponding features. In this embodiment, fin 7 extends along a plane 22 that is parallel to but spaced apart from plane 20.

In this embodiment, the fin assembly is produced separately from, and later attached to a surf craft by any suitable means.

The preferred embodiments have been developed to provide surf craft with an increased degree of manoeuvrability. This, in turn, enables the surfer to perform turns on the wave while maintaining proper momentum when progressing down the face of the wave. Turns are achieved by applying weight and/or pressure to the board at various locations so as to cause the edges and surfaces of the board to attack the water surface at different angles producing turning forces. The fins of the preferred embodiments improve the board's turning ability without unduly affecting forward speed through the water. In some embodiments the forward speed is increased.

The reasons for the improvement in performance of the fin assemblies of the preferred embodiments are presently understood to arise from the ability of those embodiments to allow the rake of the primary fin to be increased beyond what would be acceptable for a prior art fin while also providing an increased base length. The base length is increased, notwithstanding the greater undercut of the primary fin, due to the rearward extent of the secondary fin. The configuration of the secondary fin provides additional stability in use.

Surprisingly, and unlike prior art fins, the manoeuvrability of the preferred embodiments are not compromised by the increased base length. This is due to the greater rake or undercut of the primary fin. That is, the combination of features offered by the

preferred embodiments provide improved grip and hold against the water, (at the wave face and at the trough), greater ease of manoeuvrability and a substantial improvement in speed. In colloquial terms, the fin assembly provides greater drive due to the ability to trap more water.

While not wishing to be bound by theory, it is thought that the improved performance is also due, at least in part, to the emphasised curvature toward the fin tips of the longitudinally viewed fin profiles.

Assembly 1 includes a sectional area, when viewed from the side of the fin, that is substantially equivalent to the corresponding sectional area provided by a prior art Three Fin arrangement. However, the area provided by assembly 1 is distributed far differently than that of the prior art, in that fin 4 is undercut to a greater extent, and fin 7 extends rearwardly.

As the primary fin has a sectional area that is substantially less than a prior art fin, it allows the surfer to perform smaller radius turns. This then allows the surfer to carve the wave face with a greater frequency. However, the directional stability to not degraded due to the presence of the secondary fin.

The secondary fin, in some embodiments, is designed to flex slightly in a direction normal to the plane of the fin. This provides for additional acceleration out of turns.

In some embodiments, use is made of a single fin assembly that is centrally mounted to the rear of a surfboard. However, in other embodiments, three fin assemblies are used in the prior art Three Fin Thrust configuration. Moreover, the fin assembly of the invention is scalable to other water and surf craft.

Although the invention has been described with reference to specific examples, it will be appreciated to those skilled in the art that the invention may be embodied in many other forms.

DATED THIS 14th Day of January, 2002

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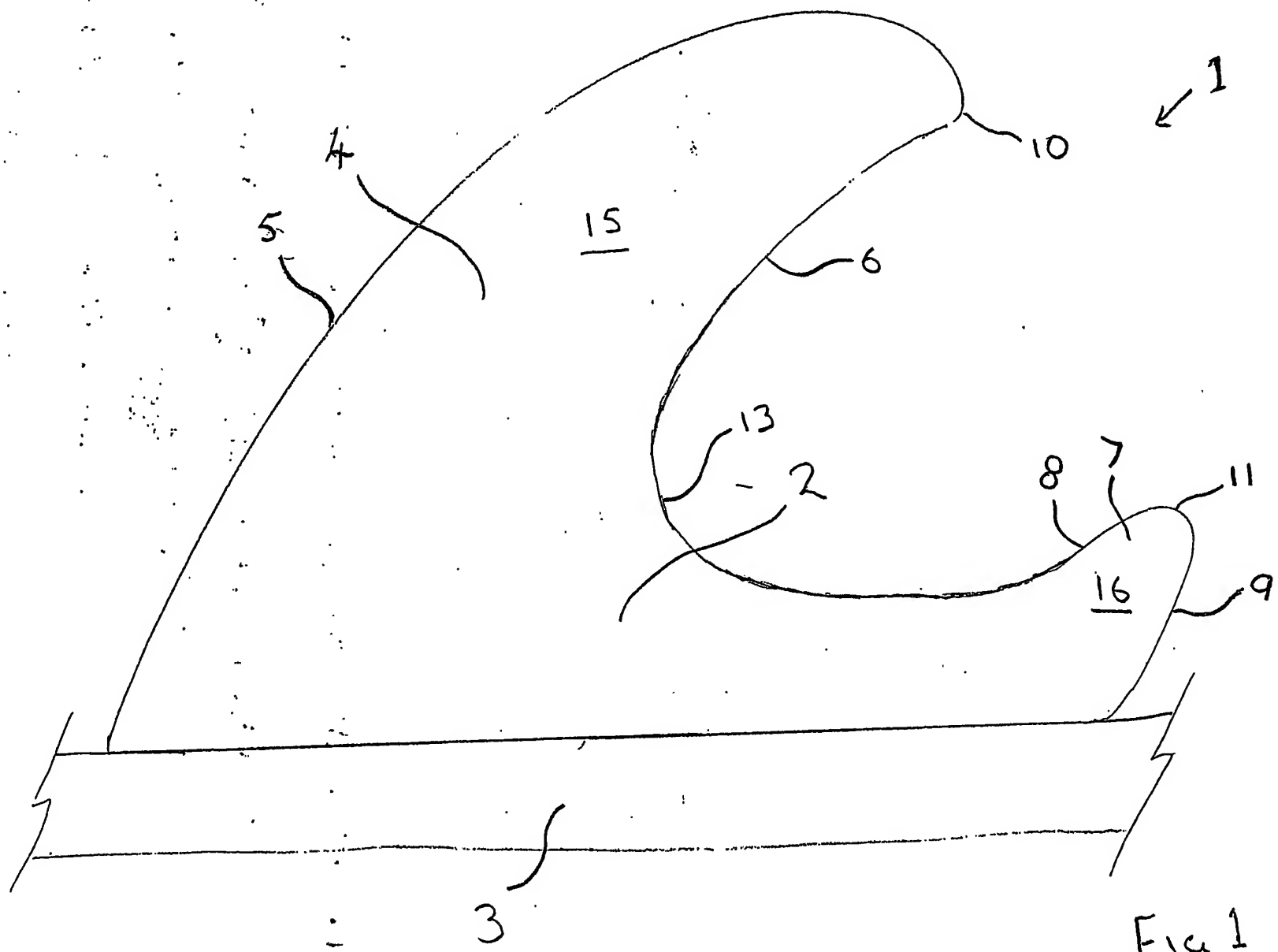

Fig 1

(2)

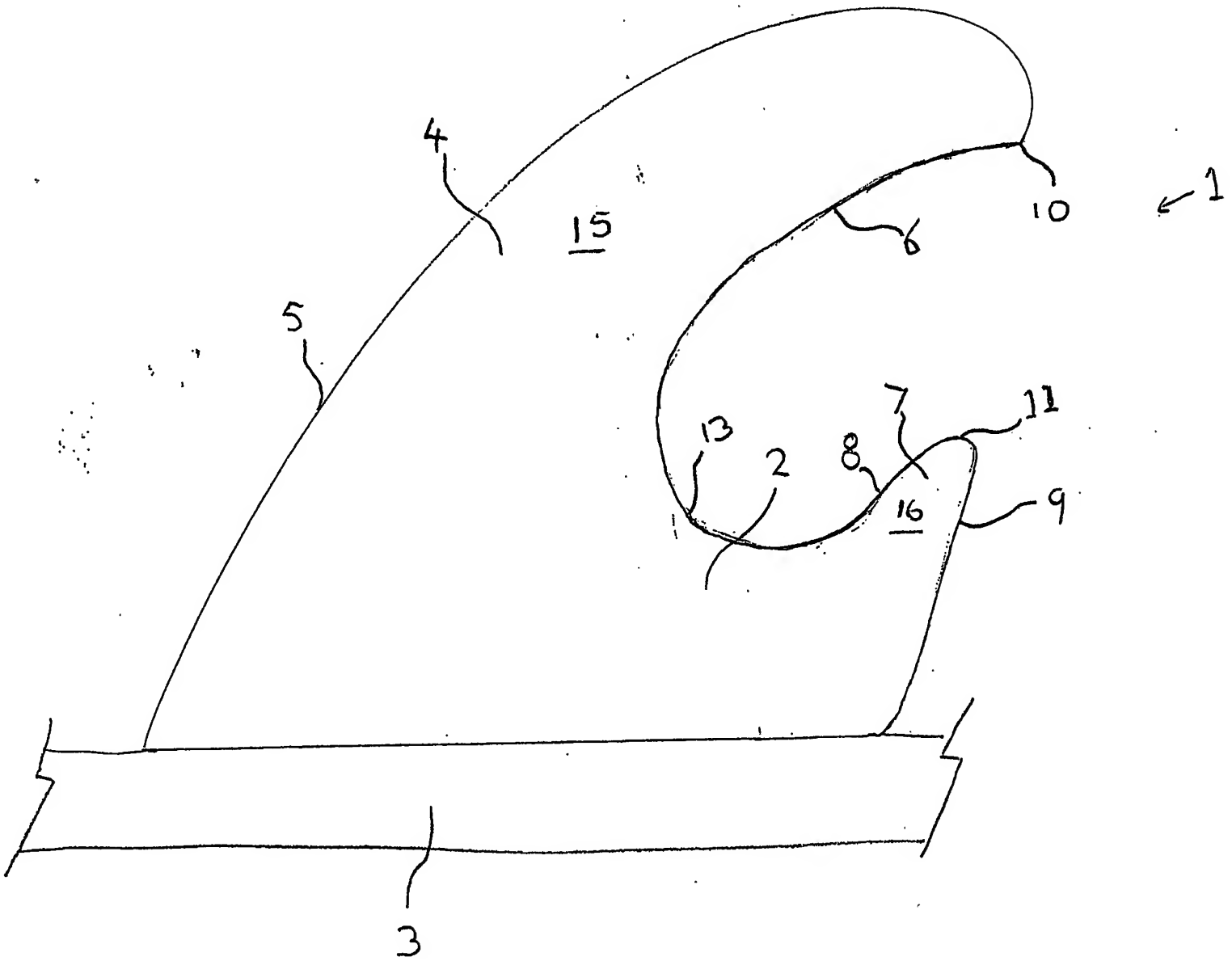

Fig 2

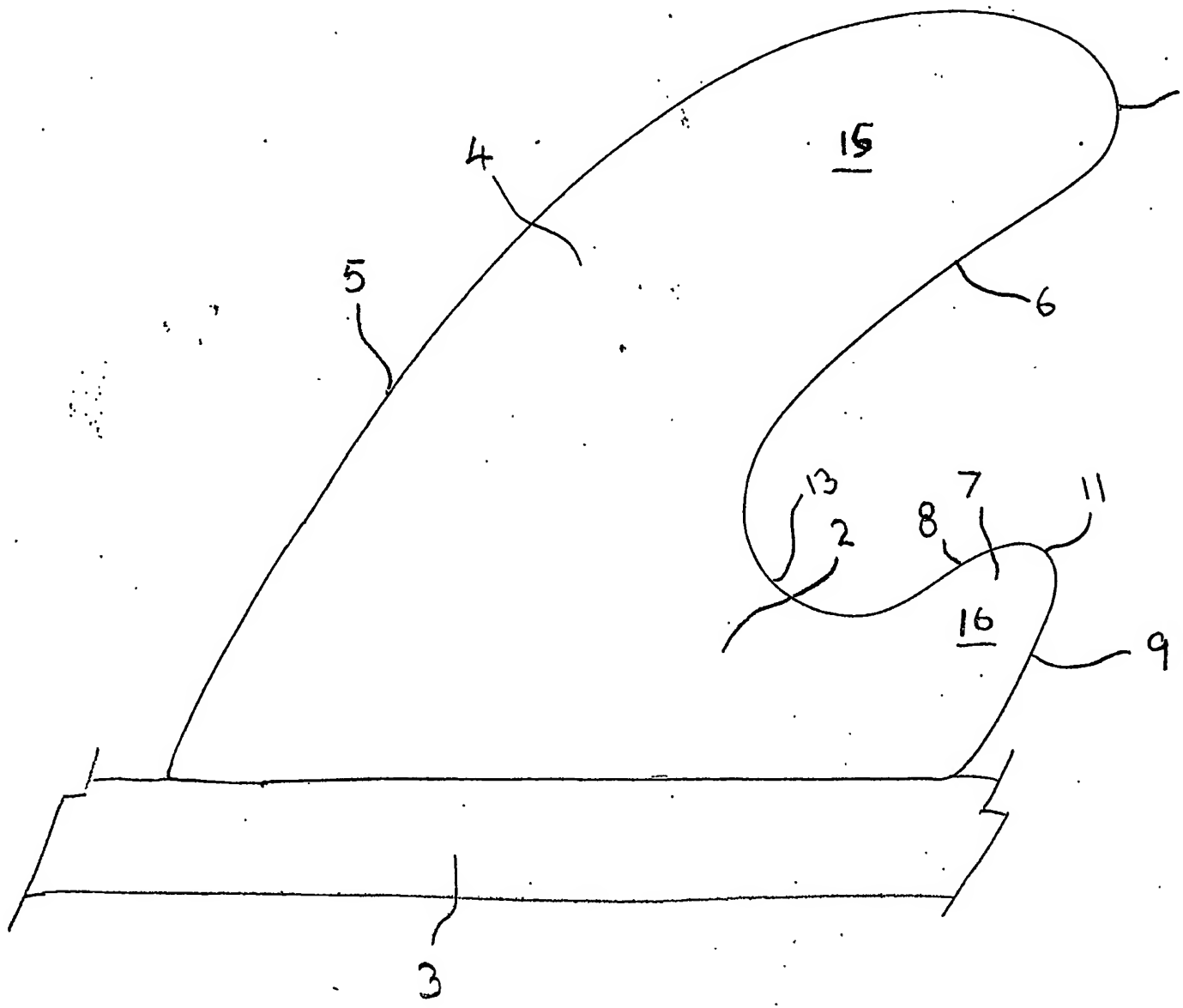

Fig 3.

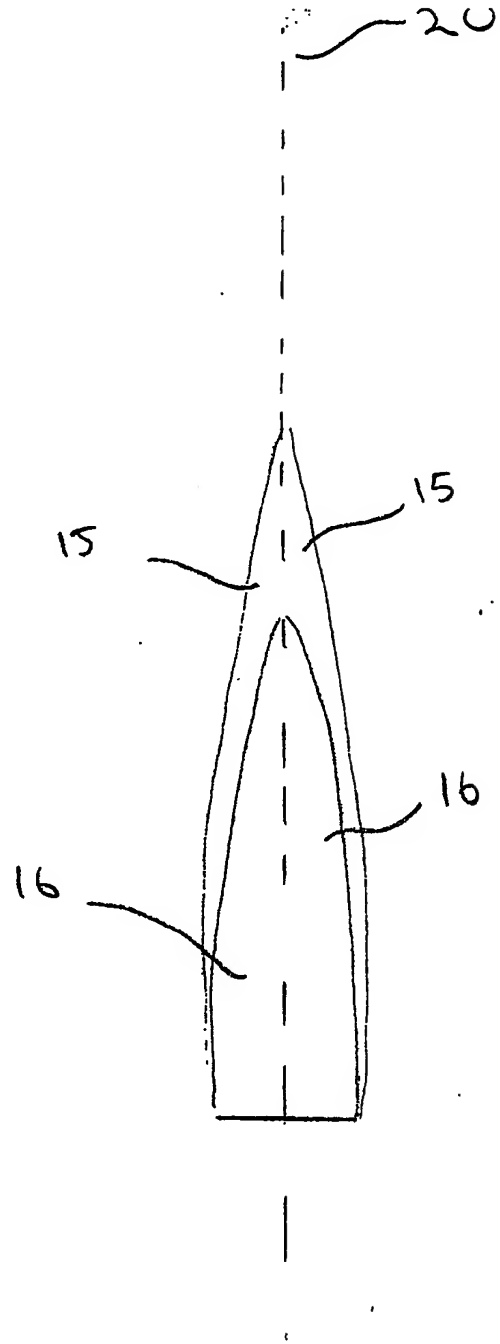

Fig 4

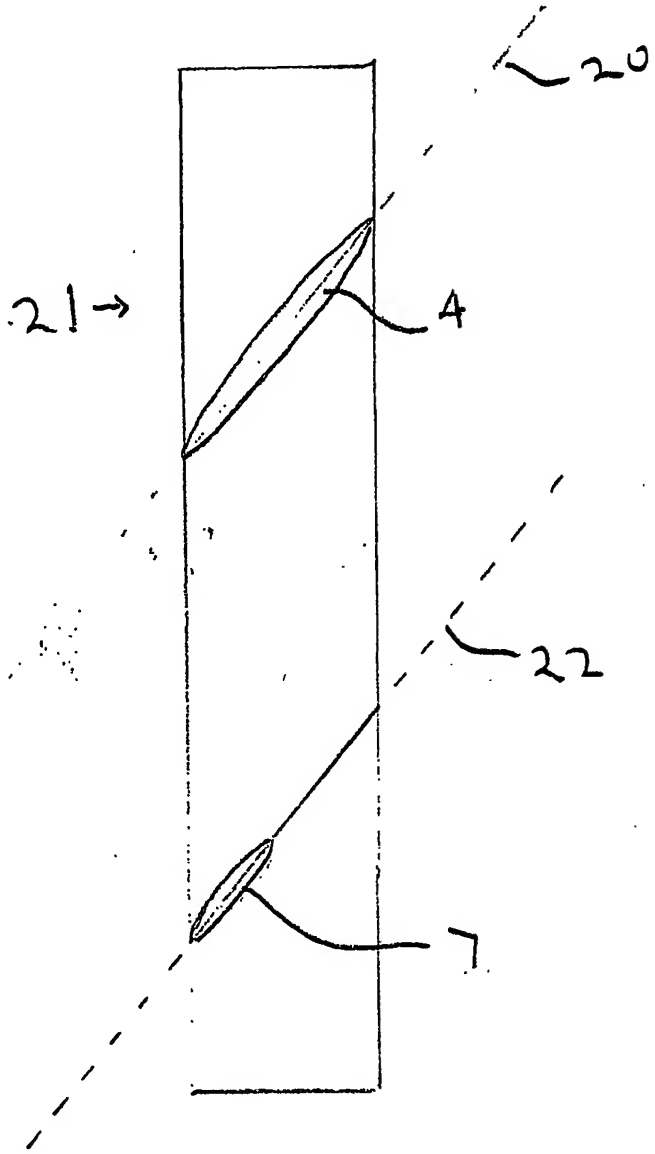

FIG 5